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EXAMINER
MCDONALD, RODNEY GLENN

ART UNIT	PAPER NUMBER
1753	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/776,223	MA ET AL.	
	Examiner	Art Unit	
	Rodney G. McDonald	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 June 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4-7, 11, 13, 14, 26-28, 32, 35 and 37-42 are rejected under 35 U.S.C. 102(b) as being anticipated by Oka et al. (U.S. Pat. 4,888,211).

Regarding claims 1, 26, 32, Oka et al. teach a method of manufacturing granular magnetic recording media. (Column 2 lines 32-36; Column 3 lines 53-59; Column 3 lines 66-68; Column 4 lines 1-2) Providing a non-magnetic substrate including a surface. (Column 6 lines 17-22) Forming a layer stack on the surface of the substrate, the layer including an outmost granular magnetic recording layer with an exposed nano-scale and porous surface. (Column 3 lines 53-59; Column 5 lines 34-39; Fig. 1) Treating the exposed nano-rough and porous surface of the granular recording layer to provide at least an increased microstructural homogeneity. The treating can include sputter etching the surface of the magnetic layer with inert gas ions of argon. (Column 11 lines 16-19; Column 11 lines 42-49) A protecting layer can be formed on the treated surface of the granular magnetic recording layer. (Column 12 lines 32-33)

Regarding claim 2, the outermost layer can be a granular perpendicular recording layer. (Column 5 lines 34-39)

Regarding claim 4, the surface of the granular magnetic recording layer is etched. (Column 11 lines 42-49)

Regarding claim 5, the etching comprises sputter etching. (Column 11 lines 42-49)

Regarding claims 6, 27, the etching includes sputter etching with an inert gas. (Column 11 lines 45-49)

Regarding claim 7, the etching includes sputter etching with Ar ions. (Column 11 lines 45-49)

Regarding claim 11, the substrate can be metals, glass or ceramics. (Column 6 lines 17-23)

Regarding claim 13, the lubricant layer can be applied over the protective layer. (Column 12 lines 32-33)

Regarding claim 14, the lubricating layer can be a perfluoropolyether material. (Column 11 line 68)

Regarding claims 28, 35 the granular magnetic recording layer is a perpendicular (i.e. vertical) magnetic recording layer. (See Abstract)

Regarding 37-42, since the process for producing the magnetic layer is the same as Applicant's process the nanoscale roughness is achieved. (Column 2 lines 32-36; Column 3 lines 53-59; Column 3 lines 66-68; Column 4 lines 1-2)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 8, 9, 12, 30, 31 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oka et al. (U.S. Pat. 4,888,211) in view of Yoshida et al. (Japan 08-055323).

The differences between Oka et al. and the present claims is the forming of a carbon protective overcoat layer is not discussed (Claim 8), forming a diamond-like carbon protective overcoat layer is not discussed (Claims 9, 33), the material of the granular Co-based alloy magnetic recording layer is not discussed (Claims 12, 30) and the Co-containing magnetic grains segregated by grain boundaries comprising at least one of oxides, nitrides and carbides is not discussed (Claims 12, 31).

Regarding claim 8, Yoshida et al. teach forming a carbon protective overcoat layer on a magnetic recording medium. (See Abstract)

Regarding claims 9, 33, Yoshida et al. teach forming a diamond-like carbon protective overcoat layer on a magnetic recording layer. (See Abstract)

Regarding claims 12, 30, Yoshida et al. teach that the magnetic recording medium can be CoPt alloy. (See Machine Translation paragraph 0008)

Regarding claims 12, 31, Yoshida et al. teach that the grain boundaries can include oxides. (See Machine Translation 0015)

The motivation for utilizing the features of Yoshida et al. is that it allows for achieving a magnetic recording medium having excellent electromagnetic conversion. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Oka et al. by utilizing the features of Yoshida et al. because it allows for achieving a magnetic recording medium having excellent electromagnetic conversion.

Claims 10 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oka et al. in view of Yoshida et al. as applied to claims 8, 9, 12, 30, 31 and 33 above, and further in view of Ono et al. (U.S. Pat. 7,147,943).

The difference between Oka et al. and the present claims is forming the DLC protective overcoat layer by ion beam deposition (IBD) is not discussed (Claims 10, 34).

Regarding claims 10, 34, Ono et al. teach forming a DLC protecting layer for a magnetic layer by ion beam deposition (IBD). (Column 8 lines 39-43)

The motivation for utilizing the feature Ono et al. is that it allows for providing a protecting layer that has high bonding force to the lubricating layer. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Ono et al. because it allows for providing a protecting layer that has high bonding force to the lubricating layer.

Claims 3, 29 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oka et al. (U.S. Pat. 4,888,211) in view of Zou et al. (U.S. Pat. 6,432,563).

The difference between Oka et al. and the present claim is that the granular magnetic recording layer is a longitudinal magnetic recording layer. (Claims 3, 29, 36)

Regarding claims 3, 29, 36, Zou et al. teach a granular magnetic layer that is longitudinal for use in magnetic medium. (Column 4 lines 61-68; Column 5 lines 35-47)

The motivation for utilizing the features of Zou et al. is that it allows for producing magnetic layers with increased coercivity and lower noise. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Oka et al. by utilizing longitudinal magnetic recording medium as taught by Zou et al. because it allows for producing magnetic layers with increased coercivity and lower noise.

Response to Arguments

Applicant's arguments filed June 15, 2007 have been fully considered but they are not persuasive.

Response to the 35 U.S.C. 102 Arguments:

In response to the argument that Oka is completely silent on the granular magnetic recording layer, it is argued that Oka teach forming a granular magnetic recording layer by vacuum deposition in the presence of oxygen and another gas. From Figure 1 the magnetic layer is shown as granular (i.e. made up of fine discrete columns). Furthermore, while Applicant has argued that the specification defines the granular magnetic layer which is one in which magnetic grains are segregated by the formation of oxides, nitrides, and/or carbides at the boundaries between adjacent grains it is argued that at least the independent claims as written do not claim the granular magnetic layer as such. Furthermore, the examiner contends that since the magnetic layer of Oka is formed in the presence of oxygen gas to form an oxide in the magnetic layer which is similar to Applicant's magnetic layer formation method the oxide material in the magnetic layer would segregate the columns of magnetic material. While Applicant has stated that the voids segregate the columnar grains it is the Examiner's position that not only the voids but also the oxide material in the magnetic layer will segregate the columnar granular material. (See Oka discussed above)

Response to the 35 U.S.C. 103 Arguments:

In response to the argument that Koa nor Yoshida teach an outermost granular magnetic recording layer, it is argued that Oka teach forming a granular magnetic recording layer by vacuum deposition in the presence of oxygen and another gas. From Figure 1 the magnetic layer is shown as granular (i.e. made up of fine discrete columns). Furthermore, while Applicant has argued that the specification defines the

granular magnetic layer which is one in which magnetic grains are segregated by the formation of oxides, nitrides, and/or carbides at the boundaries between adjacent grains it is argued that at least the independent claims as written do not claim the granular magnetic layer as such. Furthermore, the examiner contends that since the magnetic layer of Oka is formed in the presence of oxygen gas to form an oxide in the magnetic layer which is similar to Applicant's magnetic layer formation method the oxide material in the magnetic layer would segregate the columns of magnetic material. While Applicant has stated that the voids segregate the columnar grains it is the Examiner's position that not only the voids but also the oxide material in the magnetic layer will segregate the columnar granular material. (See Oka discussed above)

In response to the argument that Ono does not teach a granular magnetic recording layer, it is argued that Oka teach forming a granular magnetic recording layer by vacuum deposition in the presence of oxygen and another gas. From Figure 1 the magnetic layer is shown as granular (i.e. made up of fine discrete columns). Furthermore, while Applicant has argued that the specification defines the granular magnetic layer which is one in which magnetic grains are segregated by the formation of oxides, nitrides, and/or carbides at the boundaries between adjacent grains it is argued that at least the independent claims as written do not claim the granular magnetic layer as such. Furthermore, the examiner contends that since the magnetic layer of Oka is formed in the presence of oxygen gas to form an oxide in the magnetic layer which is similar to Applicant's magnetic layer formation method the oxide material in the magnetic layer would segregate the columns of magnetic material. While

Applicant has stated that the voids segregate the columnar grains it is the Examiner's position that not only the voids but also the oxide material in the magnetic layer will segregate the columnar granular material. (See Oka discussed above)

In response to the argument that Zou fail to teach a granular magnetic layer, it is argued that Oka teach forming a granular magnetic recording layer by vacuum deposition in the presence of oxygen and another gas. From Figure 1 the magnetic layer is shown as granular (i.e. made up of fine discrete columns). Furthermore, while Applicant has argued that the specification defines the granular magnetic layer which is one in which magnetic grains are segregated by the formation of oxides, nitrides, and/or carbides at the boundaries between adjacent grains it is argued that at least the independent claims as written do not claim the granular magnetic layer as such. Furthermore, the examiner contends that since the magnetic layer of Oka is formed in the presence of oxygen gas to form an oxide in the magnetic layer which is similar to Applicant's magnetic layer formation method the oxide material in the magnetic layer would segregate the columns of magnetic material. While Applicant has stated that the voids segregate the columnar grains it is the Examiner's position that not only the voids but also the oxide material in the magnetic layer will segregate the columnar granular material. (See Oka discussed above)

In response to the argument that none of the references teach the nano-scale roughness being less than 2.0 Angstroms, it is argued that since the process for producing the magnetic layer is the same as Applicant's process the nanoscale

roughness is achieved. (Column 2 lines 32-36; Column 3 lines 53-59; Column 3 lines 66-68; Column 4 lines 1-2)

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M-TH with every Friday off..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Rodney G. McDonald
Primary Examiner
Art Unit 1753

RM
August 29, 2007